

Protecting Young Workers

A Guide for Building a State Surveillance System for Work-Related Injuries to Youths

Massachusetts Department of Public Health

Occupational Health Surveillance Program

Teens at Work: Injury Surveillance and Prevention Project

with **Education Development Center, Inc.**

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Preface

Each year in the United States, an estimated 230,000 teens under age 18 are injured on the job. Over 75,000 are injured seriously enough to require treatment in emergency departments. According to emergency department data, teenagers are injured on the job at a substantially higher rate than adults. And, every year, about 70 young workers die as a result of injuries at work.

Without action, teens will continue to be injured on the job. At any given point in time, one third of those 15–17 years of age are employed. Eighty percent of teens work at some point during high school. Work can have many benefits for young people. It can help them develop job skills and enhance self-esteem, as well as provide income that they and their families may need. It is important that this experience be safe. Efforts to protect young workers can also provide teens with important health and safety skills that they will carry with them as workers and employers of the future.

Protecting young workers from injuries requires efforts that mobilize communities and forge new collaborations among occupational health experts, public health professionals, schools, employers, and unions, as well as teens and their families. The first step in this process is demonstrating that young workers are at risk. Information about where and how teens are injured at work is needed to mobilize action and guide prevention efforts.

National data can play an important role in showing that young people face hazards in the workplace and identify industries where interventions are needed. Based on the national data, it is reasonable to assume, for example, that a substantial proportion of injuries to young workers in any state occur in restaurants and grocery stores. But relying on national statistics can obscure dangers that may be specific to a particular state. In some states, agricultural injuries may be the most serious problem for young workers. Other states may have problems with injuries to young people employed by hotels and seasonal tourist industries. State data can help identify the specific industries, occupations, and communities in which workplace hazards to teens need to be addressed. State data can also pinpoint specific workplaces in which young workers are at risk and intervention is necessary. And state data can be a powerful way of attracting the attention and gaining the support of local policymakers and the public.

Surveillance of work-related injuries to youth is a crucial step in understanding the nature and extent of this problem and developing and evaluating strategies for preventing these injuries. We hope this guidebook will help you take this step.

I. Introduction

The Occupational Health Surveillance Program (OHSP) at the Massachusetts Department of Public Health (MDPH) has conducted surveillance of work-related injuries to youths under age 18 since 1993. Surveillance findings are used to target prevention activities ranging from interventions in specific workplaces to statewide efforts to educate youth about workplace health and safety. Since initiating this state surveillance system, which is called the Teens at Work Injury Surveillance and Prevention Project (TAW), OHSP has received a large number of requests for data, as well as requests for advice on surveillance. In 2000, the National Institute of Occupational Safety and Health (NIOSH) funded the creation of this guidebook to assist other states in conducting surveillance of work-related injuries to teens.

A Short History of the Massachusetts Teens At Work Injury Surveillance and Prevention Project

In the early 1980s, the MDPH Childhood Injury Control Program undertook a landmark project to document the nature and extent of all injuries to youth. The project collected data on injuries to those under age 20 from emergency departments in 14 Massachusetts cities and towns. A first look at these data revealed that an unanticipated number of injuries occurred to teens in the workplace. The Childhood Injury Control Program approached OHSP with their concerns about work-related injuries. In 1990, OHSP undertook a more thorough analysis of these data and found that 13 percent of the injuries (with known locations of injury) among those 14–17 years of age occurred at work. They estimated that every year, 16 of every 100 full-time workers aged 16–17 years in Massachusetts were injured on the job.

Knowing that national research showed that only about 30 percent of work-related injuries are treated in emergency departments, OHSP turned to workers' compensation data for more information. In 1991, OHSP analyzed four years (1987–1990) of workers' compensation claims filed for injuries resulting in five or more lost workdays to workers under age 18. More than 700 such claims were filed each year. This represented only the tip of the occupational injury iceberg, since these claims did not capture the less serious injuries (those that did not result in five or more lost workdays). The OHSP staff also suspected that many young workers did not apply for workers' compensation benefits when injured.

Comparing the information from the workers' compensation and emergency department data sets demonstrated that neither system revealed the full extent of teen worker injuries and that the injury picture in the state varied depending upon which data source one used. According to the workers' compensation data, strains and sprains were the most common work-related injuries to teens, whereas lacerations were the most frequent injuries to young workers treated in emergency departments. Each data set provided an important but discrete piece of the teen worker-injury puzzle.

Armed with this information, OHSP set out, in 1992, to develop a comprehensive surveillance system that would use multiple data sources to identify work-related injuries to teens.

That year OHSP was successful in adding work-related injuries to persons under age 18 to the list of health conditions that health care providers and hospitals are required to report to MDPH. In 1993, OHSP applied for and received funding from the NIOSH Sentinel Event Notification System for Occupational Risks (SENSOR) program to create a surveillance system for occupational injuries to youth under the age of 18. This system, called Teens at Work, uses multiple data sources, including workers' compensation claims and emergency department and in-patient records, to identify cases of teen work injuries. It collects additional data through follow-up interviews with selected cases, and produces both individual

case reports and summary data. These data are then linked with intervention activities designed to prevent further injuries to teens.

How To Use This Guide

Surveillance systems for work-related injuries to teens will necessarily vary from state to state, depending on available data sources and resources, the types of industries in which youth are employed, and the structure of the state's public health system. While most states will not have access to all the data sources used in Massachusetts, most will have some data that can be used to track young worker injuries.

We offer this guide not as a template, but as a model that can be adapted to fit your state's needs. Rather than telling you what to do, we tell you what we do in Massachusetts. We have included suggestions for how states without access to all the data sources available in Massachusetts can collect meaningful data using the sources available to them. And we offer suggestions for how these data can be used to prevent injuries to young workers. For just as prevention should be guided by data, surveillance should be linked to prevention.

II. Building a Surveillance System

Getting Started

OHSP identified four initial steps for building a surveillance system for work-related injuries to youth:

- Establish surveillance objectives through answering the question, “What is it that we want to know about work-related injuries to teens?”
- Identify data sources that can be used to identify cases of work-related injuries to teens
- Develop a surveillance case definition
- Build working relationships with the agencies and individuals that can provide data and also those that can take action based on these data

TAW worked on these four tasks simultaneously, as described below.

1. Surveillance Objectives

OHSP established the following objectives for the surveillance system:

- (1) To identify individual young people who have been injured on the job (sentinel cases) in a timely fashion in order to:
 - (a) conduct follow-up interviews to learn more about the factors potentially contributing to these injuries and the impact of these injuries on teens, and
 - (b) identify work-sites in which interventions are needed to eliminate hazards faced by young workers.
- (2) To generate meaningful summary data on the nature and extent of work-related injuries that can be used to guide broad-based prevention activities targeting common hazards and the industries, occupations, and communities in which young workers are at greatest risk.

To work towards these objectives, TAW combined case-based and population-based approaches to surveillance. Case-based surveillance involves collecting personally identifiable data on individual injured workers in a timely fashion. It allows the surveillance program to conduct case follow-up with the worker and intervene at the worksite. Population-based systems involve the use of representative data sets, which do not necessarily include personal or employer identifiers, to monitor distribution of injuries by demographic characteristics, nature and cause of injury, industry and occupation, time, and locale.

2. Identification of Data Sources for Surveillance

OHSP identified several state data sources that could be used both to identify individual cases of work-related injuries to teens less than 18 years of age and to generate summary data. These data sources include the following:

- Workers’ compensation claims for injuries resulting in five or more lost workdays
- Emergency department data
- Hospital discharge data
- Fatality data collected by the Massachusetts Fatality Assessment, Control and Evaluation (FACE) program and by the Census of Fatal Occupational Injuries (CFOI)

These data sources are described in greater detail in Section III, Case Ascertainment.

Bureau of Labor Statistics Annual Survey of Occupational Injuries and Illnesses

Another data source available to over 40 states is the Bureau of Labor Statistics (BLS) Annual Survey of Occupational Injuries and Illnesses.¹ This survey is based on a sample of injury and illness logs that employers are required to maintain under the Occupational Safety and Health Act. While the survey collects data on all work-related injuries requiring more than first aid, information about age is available only for those injuries resulting in at least one day away from work. The survey does not provide information about individual cases nor about specific workplaces. It can provide estimates of the number (not rates) of work-related injuries to teens resulting in days away from work, some information about the industries and occupations in which teens are injured, and the leading types of teen injuries. In the less populous states, the sample size may be too small to obtain detailed data on teen injuries. States need to request special data runs to obtain the available data on teens injuries from the BLS. (Contact information for regional BLS offices is provided at www.bls.gov/iif/home.htm.)

3. Surveillance Case Definition

The surveillance case definition specifies what is to be counted as a case by the surveillance system. The creation of a case definition is driven by the objectives of the surveillance system and by the available sources of data. The TAW surveillance case definition encompasses the following:

- A medically treated traumatic injury to a person under age 18 sustained while the person was working for pay
- A traumatic injury to a person under age 18 for which a workers' compensation lost-time claim has been filed
- A fatal occupational injury to a person under age 18

A TAW case is an injury, not a person. If a teen sustains more than one work-related injury at different points in time, each incident is counted as a separate case.

TAW chose to limit cases to injuries to teens under age 18 because these teens are legally defined as minors and covered under the state and federal child labor laws.

TAW originally planned to restrict the surveillance system to serious work-related injuries to youth under age 18. We found, however, that with the exception of the relatively few cases that are clearly serious—amputations, for example—it was not possible to distinguish serious from nonserious cases given the limited injury information contained in the surveillance data sources. The case definition was changed to reflect this reality.

Although OHSP was interested in injuries to teens in vocational education programs, teens in school shops in Massachusetts are not considered employees from a legal perspective and are not subject to child labor laws nor covered by OSHA. Injuries to teens in school shops are not reportable under the public health reporting law. Therefore, the surveillance case definition excludes injuries to teens in vocational education classes within schools. An injury to a teen in a paid job placement coordinated through school, however, is considered a case.

4. Working Relationships

It is important to begin building working relationships with agencies, organizations and individuals who have key roles to play in the surveillance system as early as possible in the process of creating the surveillance system. These partners include not only those who can provide data but also those with responsibility for preventing work-related injuries to youth. Disseminating surveillance data to those “who need to know and are in a position to take action”, and following up to see that action has been taken are fundamental aspects of surveillance.² Thus, it is critical to consider the range of prevention options and players that are available in designing the surveillance system.

TAW contacted the agencies and programs that maintain the data sources that we planned to use for surveillance, such as the state workers' compensation agency, the Massachusetts FACE and CFOI programs, and hospital emergency departments, early in our efforts. We also established relationships with government agencies that can intervene in individual workplaces, including the regional office of the Occupational Health and Safety Administration and the state and federal agencies responsible for enforcing child labor laws.

OHSP has an Advisory Board that includes representatives from agencies and organizations concerned with worker occupational safety and health. When TAW was established, OHSP added several organizations and agencies with an interest in young worker health to the Advisory Board. These included Education Development Center, Inc., Massachusetts Safety Council, and the Massachusetts Attorney General's Office. We subsequently established a separate state child labor team—now called the Interagency Working Group on Youth Employment—that focuses specifically on young workers' safety and health. More information on this effort can be found in Section VI, Prevention.

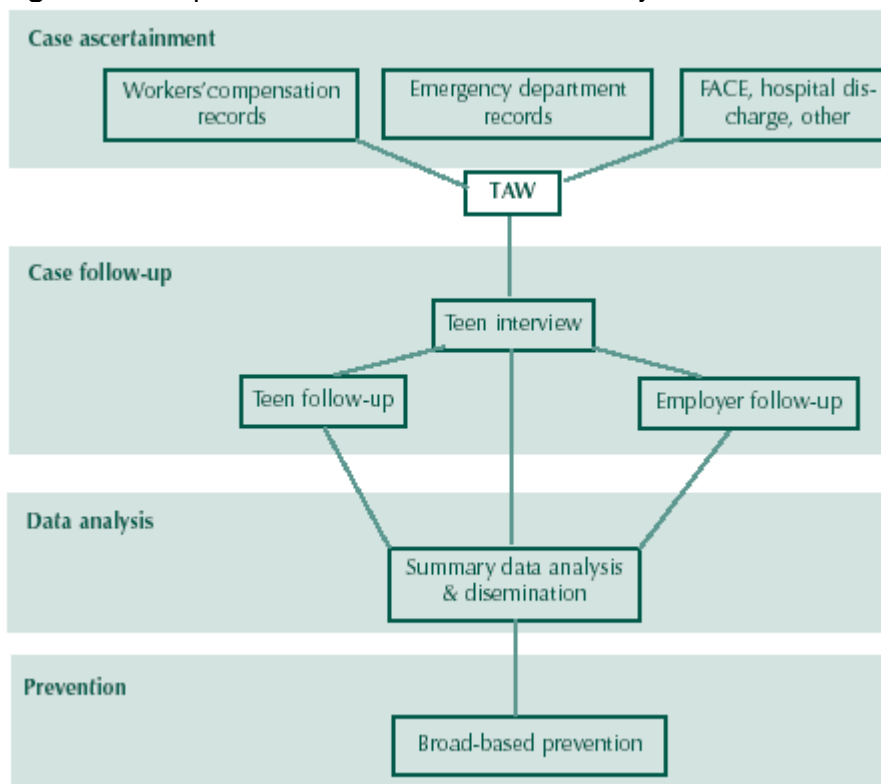
Surveillance System Components

The TAW surveillance system has four major components (see Figure 1):

- Case ascertainment (worker' compensation claims, emergency department reports, hospital discharge, FACE, other)
- Case follow-up (teen follow-up and employer follow-up)
- Data analysis and dissemination
- Broad-based prevention

Each of these is discussed in detail in the following sections of this guide.

Figure 1. Components of the TAW surveillance system



III. Case Ascertainment

Time is of the essence for sentinel case surveillance. (See definition in Section IV, Case Follow-up.) It is critical to identify cases as soon as possible after the injury occurs so the injured young people can be interviewed while their memories are fresh and timely worksite intervention to control hazards can be carried out. Timeliness is less critical for population-based surveillance. A one-to-two-year lag is common in reporting summary data.

The major data sources that TAW uses to ascertain cases and the methods for obtaining the data are described below.

Workers' Compensation Claims

The Department of Industrial Accidents (Massachusetts's workers' compensation agency) maintains a computerized database of all workers' compensation claims filed for injuries resulting in five or more lost workdays. TAW uses workers' compensation data for both sentinel and population-based surveillance.

Obtaining the Data

TAW receives hard copy reports of all claims filed with the Department of Industrial Accidents during the prior week. These reports are routinely produced by the Department of Industrial Accidents for administrative purposes. The TAW staff reviews these reports to identify individual cases of injured teens for follow-up, using age to identify injured teens. To avoid the need to manually enter the workers' compensation data into the surveillance database, the Department of Industrial Accidents downloads data on all workers' compensation claims filed by persons under 18 years old to a CD-ROM and forwards it to TAW every three months.

Data Elements

The key data elements collected from the Massachusetts' workers' compensation system include the following:

- **Demographic data** on injured young workers, including name, address, telephone number, birth date, and sex.
- **Employment data**, including name and address of employer, standard industrial classification (SIC) code, and occupation or job title of the injured worker.
- **Injury and incident data**, including ANSI codes for nature of injury and body part injured, a brief narrative description of how the injury occurred, and the date of injury.

Data Strengths

The Massachusetts workers' compensation database is extremely useful for both sentinel and population-based surveillance. The data have the following advantages:

- They identify serious injuries to young worker since the database is comprised of claims for injuries resulting in five or more lost workdays.
- They are received in a timely fashion, allowing for sentinel case follow-up.
- They contain personal identifiers (including the name and address of the injured worker), which are useful for sentinel case follow-up, merging compensation data with data from other sources, and eliminating duplicates.
- They contain employer identifiers (including the name and address of the employer), which are useful for sentinel case follow-up, identifying firms or worksites where multiple injuries have occurred, targeting worksite intervention activities and outreach to specific employers, and coding the type of industry for population-based data analysis.

- They provide information on all lost work time claims filed by teens in Massachusetts and therefore can be used to track trends.
- They have a high predictive value positive—i.e., the records successfully exclude injuries that are not work-related.

Data Limitations

The workers' compensation database in Massachusetts also has features that limit its usefulness to TAW. The data in this system have the following disadvantages:

- They are limited to people who are both covered by workers' compensation and meet eligibility requirements for wage compensation (at least five lost work days), therefore excluding injuries to self-employed teens—such as news carriers, who are not covered by workers' compensation—and claims filed solely for the purpose of obtaining medical benefits.
- They are incomplete, since not all injured working teens who are eligible for workers' compensation file claims. There is some research indicating that teens injured on the job who are eligible for workers' compensation are less likely to file claims than adults.³
- They require a fair amount of cleaning and coding, since the data are intended for use in an insurance system, rather than a surveillance system.

Number

An average of 400 cases of occupational injuries to youth are identified by TAW through workers' compensation lost work time claims each year.

How Your State May Differ

Workers' compensation is a state-run insurance system that provides payment of medical bills (medical benefits) and lost wages (wage replacement benefits—also called indemnity benefits) for individuals with work-related injuries or illnesses. These systems, including the eligibility requirements for benefits, vary from state to state. In Massachusetts, workers must miss at least five days of work as a result of their injury or illness to become eligible for wage replacement benefits. If a worker does not miss five workdays, he or she may still file a claim for medical benefits. Thus some workers' compensation claims are filed solely for the purpose of obtaining medical benefits.

The workers' compensation database maintained by the Massachusetts Department of Industrial Accidents does not include claims filed for medical benefits only. It also does not distinguish between claims filed and claims awarded benefits. Some states maintain data on all claims, not just claims for wage replacement. The "medical only" claim data can provide additional information about less serious injuries. In some states, it is possible to identify cases in which workers' compensation benefits have been awarded and exclude claims found not to meet the legal requirements for compensation. Findings based on awarded claims will provide a more conservative estimate of the injury problem than findings based on all claims filed.

The confidentiality of workers' compensation records also differs by state. In Massachusetts, workers' compensation records are confidential. It took months of negotiations before TAW gained access to the data. The process for sharing data between agencies should be formally documented in a memorandum of understanding. Relying on informal agreements and personal relationships can jeopardize access to data when staff changes or memories fade.

Annual access to workers' compensation data should be sufficient for population-based surveillance systems that do not include sentinel case surveillance and follow-up.

Emergency Department Data

Massachusetts hospitals maintain computerized data on emergency department visits for billing and other administrative purposes. Some hospitals also maintain computerized emergency department logs, which may or may not be linked to the billing data systems. TAW obtains data on work-related injuries to teens on a monthly basis from a sample of Massachusetts emergency departments.

These emergency department records are used for sentinel case surveillance. The emergency department data are also used for population-based surveillance, i.e., to examine injury patterns and trends. However, use of these data for summary data analysis is limited because the data from the sample of participating hospitals is not necessarily representative of data from emergency departments statewide.

Obtaining the Data

Eleven hospitals mail monthly computer-generated reports of work-related injuries to youths treated in their emergency departments to TAW. The hospitals submit data from administrative databases, which combine basic clinical data and administrative information that is obtained while registering patients. Most hospitals identify cases by searching for patients under 18 years of age that have workers' compensation listed as the expected payer. Several hospitals include "injury at work" as a distinct data element in their systems. These hospitals also use this element, in addition to payer source, to identify cases. One additional hospital submits individual case reports by fax using the MDPH Occupational Injury and Illness reporting form (see Appendix A).

Data Elements

The key data elements collected from Massachusetts emergency departments include the following:

- **Demographic data** on injured young workers, including name, address, telephone number, age or birth date, and sex
- **Data on employers**, including name and address
- **Injury data**, including chief complaint or reason for visit and date of treatment

Data Strengths

Emergency department data are extremely useful for sentinel case surveillance, augmenting the information obtained through the workers' compensation system to provide a better view of young worker injuries. Emergency department data have the following advantages:

- They are received in a relatively timely fashion, allowing for sentinel case follow-up.
- They contain personal identifiers. The name and address of the injured worker are useful for sentinel case follow-up, merging emergency department data with data from other sources, and eliminating duplicates.
- They contain employer identifiers. The name of the employer is available for almost all cases (availability of employers' addresses varies by hospital) and is useful for sentinel case follow-up, identifying firms where multiple injuries have occurred, targeting intervention activities and outreach to specific employers, and coding the type of industry for data analysis by industry.
- They augment the number of cases identified using workers' compensation records. Fewer than three percent of the injury cases identified through emergency department records are also identified by workers' compensation data. Emergency department data demonstrate that the injuries identified by the workers' compensation database are only the "tip of the iceberg."
- They help provide a more accurate picture of injuries to young workers, since the types of injuries treated in emergency departments differ markedly from those included in the workers' compensation system.
- They have a high predictive value positive. TAW can exclude adults and injuries occurring in locations other than workplaces by searching by age and payer source. Almost all emergency department cases followed up by TAW have been teens with work-related injuries. Few misclassified cases have been reported to the system.

Data Limitations

Massachusetts emergency department data also have features that limit its usefulness to TAW.

Emergency department data collected by TAW have the following disadvantages:

- They fail to capture some cases of injuries to young workers because not all young workers file workers' compensation claims for work-related injuries and expected payer is used to identify most cases.
- They are completed and submitted prior to standardized injury coding by hospital medical record personnel, thus do not contain nature-of-injury or external-cause-of-injury codes.
- They often omit the young person's occupation or records the occupation as "student," forcing TAW staff to code occupation as nonclassifiable.
- They are not necessarily representative of emergency department visits to all Massachusetts emergency departments, and are thus of somewhat limited use for population-based analysis.

Numbers

TAW identifies an average of 390 cases of occupational injuries to young workers each year using emergency department data from the sample of 12 reporting hospitals.

How Your State May Differ

TAW is able to obtain emergency department data with personal identifiers because state public health regulations require hospitals to report cases of occupational injuries to young workers to MDPH. In states without such regulations, it may be difficult or impossible to obtain data from emergency departments containing personal identifiers.

A number of states, including Massachusetts, are developing statewide databases of emergency department visits, similar to the databases of hospital discharges that now exist in most states. In Massachusetts, this system will include neither personal nor employer identifiers, and data will not be available until at least six months after the injury occurs. Thus, this statewide database of emergency department visits will not be useful for sentinel case surveillance.

However, it will be collected after standardized injury coding at the hospital and will provide overall counts of work-related injuries to youth and their distribution by nature and cause of injury. It will not provide information about the distribution of these injuries by industry or occupation.

Mandatory Reporting of Work-Related Injuries to Teens in Massachusetts

In 1992, the Massachusetts Department of Public Health revised the public health regulations concerning the diseases and medical conditions that physicians and health care facilities are required to report to the MDPH. This provided an opportunity to learn more about occupational injuries to youths. The occupational Health Surveillance Program was successful in adding a number of work related health outcomes, including work-related injuries to persons under 18 years old, to the list of reportable conditions. The regulations (see Appendix B) include the following reporting requirements*:

A. Physicians and other health care providers must report serious work-related injuries to persons under 18 years of age. A reportable injury is one that

“(1) results in death, hospitalization or, in the judgment of the treating physician, results in significant scarring or disfigurement, permanent disability, significant loss of consciousness, or loss of a body part or bodily function; or which

(2) the physician determines is less significant but is of the same or similar nature to injuries previously sustained at the same place of employment.”

Physicians and other health care providers may report all work-related traumatic injuries to persons under 18 years of age.

B. Health care facilities must report all work-related traumatic injuries to persons under 18 years of age treated in that facility on at least a semiannual basis.

Many health care facilities or providers may think that confidentiality laws are a barrier to reporting work-related traumatic injuries to MDPH without the individual's permission. However, since reporting to MDPH is required or permitted under state regulations, there is no violation of HIPAA or other privacy laws. Nonetheless, getting individual physicians to report cases of work-related health problems is an uphill battle that is becoming even more difficult with increasing pressures on the health care delivery system. TAW chose to address this problem by focusing its outreach on hospital emergency departments and soliciting computer-generated reports of cases of work-related injuries to teens.

TAW did not have the resources to negotiate data submission with the more than 80 Massachusetts hospitals with emergency departments. We contacted a sample of approximately 25 hospitals (chosen on the basis of hospital size and geography). Eleven hospitals agreed to participate. We found that it is critical to first get the endorsement of both the director of the emergency department and the nurse manager, and then to work with the data systems staff on mechanisms for generating monthly reports. We agreed to accept those variables that were available in the hospital data systems and not require the hospitals to collect any additional data. For example, although we request information about the occupation of the injured teen, this information is not routinely collected or recorded by hospitals, so we accept hospital reports without this information. We found that “taking what we can get” is more productive than requesting data that hospitals cannot produce.

Ongoing feedback to the hospitals and the individuals who actually report these data is essential to ensure their continued participation. Summary data reports and other educational materials produced by TAW are periodically sent to the hospital staff responsible for reporting.

* In 2003 the regulations were amended to include other health care providers as mandated reporters.

Hospital Discharge Data

The MDPH collects and maintains a computerized database of discharges from all non-federal acute care hospitals in the state. TAW has access to the database, known as the Hospital Discharge Dataset, approximately one year after the time of discharge. Because of the time lag, the data are not useful for sentinel case surveillance. However, they are used by TAW to identify serious work-related injuries to teens not captured by other more timely data sources.

Obtaining the Data

The TAW staff searches the Hospital Discharge Dataset annually to identify patients under age 18 for whom workers' compensation is listed as the expected payer. Letters are sent to hospitals in which possible cases of injuries to young workers have been identified, indicating that state law mandates that these cases are reportable to MDPH and requesting that an enclosed reporting form be completed and returned for each case or a copy of the discharge summary for the visit be sent. (Examples of a reporting form and these letters can be found in Appendices A and C.) The TAW staff reviews these reports to identify cases that fulfill the surveillance system case definition and have not been identified through other data sources. All cases are entered into the surveillance database.

Data Elements

The key data elements collected from hospital discharge data include the following:

Demographic data, including sex, race, zip code, and birth date of injured young worker

Institutional data, including hospital facility numbers, medical record numbers, and expected payer

Injury data, including diagnosis codes and dates of hospitalization

Data Strengths

Hospital discharge data are useful in identifying serious, nonfatal injuries that have not been identified through other more timely data sources. In Massachusetts, these data have the following advantages:

- They include information on all hospital discharges in the state.
- They do not include personal identifiers, but still allow TAW staff to identify possible work-related injuries through information about age and payer source.
- They have a high predictive positive value—searching by age and payer source successfully excludes injuries to adults and injuries occurring in locations other than workplaces.

Data Limitations

Hospital discharge data also have a number of features that limit their usefulness for the surveillance of injuries to young workers. In Massachusetts, hospital discharge data have the following disadvantages:

- They cannot be used for sentinel case surveillance because of the gap between the time the injuries occur and the time the patient medical records are received by TAW.
- They identify a relatively low number of cases that have not already been identified by other TAW data sources. About half of all cases identified by using hospital discharge data have already been identified by other sources.
- They are labor intensive to use and require duplication of efforts, because there is no simple way of determining if the cases in hospital discharge data have already been identified through other sources until after the medical records are received.
- They fail to capture some cases of injuries to young workers requiring hospitalization because not all young workers file workers' compensation claims for work-related injuries.

Numbers

On average, TAW identifies fewer than 10 cases (including duplicates) of occupational injuries to people under the age of 18 each year by using Massachusetts hospital discharge data.

How Your State May Differ

Most states collect and maintain data on all hospital discharges. In many states, the data are not collected and maintained by the state health department, and health department access to the data in some states may be limited.

TAW is able to obtain Massachusetts hospital discharge data and follow-up with hospitals to obtain medical records because state public health regulations require hospitals to report cases of occupational injuries to young workers to MDPH. In states without such regulations, it may be difficult or impossible to use the hospital discharge for this purpose. Hospitals may refuse to release patient medical records on the grounds of confidentiality. Nevertheless, the statewide hospital discharge dataset can still be used to provide an annual count of work-related hospitalizations to teens in the state and the distribution of these hospitalizations by nature (and cause of injury if codes for external cause of injury are included in the state dataset). Some states may also have more timely access to the data.

The Census of Fatal Occupational Injuries and the Fatality Assessment and Control Evaluation Project

MDPH conducts surveillance of all fatal work-related injuries as part of the national Census of Fatal Occupational Injuries (CFOI), which is funded by the Bureau of Labor Statistics, U.S. Department of Labor. MDPH also conducts surveillance and in-depth, research-oriented investigations of targeted work-related fatalities, including deaths among youths under age 18, as part of the Fatality Assessment and Control Evaluation project (FACE), sponsored by the National Institute of Occupational Safety and Health. FACE reports, which provide detailed information about these events and include recommendations to prevent similar incidents, are distributed widely to workers, employers, and health and safety professionals. TAW uses FACE data for sentinel case surveillance of fatal occupational injuries to teens and includes these fatal cases in the surveillance dataset for population-based data analysis.

Obtaining the Data

TAW negotiated an agreement with the FACE project in which FACE immediately notifies TAW about any teen under 18 years of age who is killed on the job. These cases are included in the surveillance database with FACE listed as the reporter.

Data Elements

The key data elements collected from the FACE project include the following:

- **Demographic data**, including the deceased's name, address, age, sex, and death date
- **Employment data**, including name and address of employer, Standard Industrial Code, and occupation or job title
- **Incident and injury data**, including incident location, source of the injury (that is, what caused the injury), nature of the injury, and event (that is, what happened to cause the injury), including a brief description of the incident

Data Strengths

Fatal occupational injuries to youth are clearly the most serious injuries and are thus important to include in the surveillance system. The FACE project is a good source of information for sentinel surveillance and population-based surveillance of fatal occupational injuries to youth for the following reasons:

- This system uses multiple data sources to identify and verify all work-related deaths in the state.
- It captures most of the fatal cases. Examples of data sources used include death certificates, workers' compensation, Coast Guard and OSHA reports, calls from police, town clerks who issue death certificates, and newspaper clippings.
- The system identifies cases in a timely fashion.
- The system provides detailed information about fatal incidents. The data are coded using standardized

coding systems for industry, occupation, nature and source of injury, and event.

Data Limitations

Because the number of fatal injuries to young workers in any year in any state is relatively small, data are of limited usefulness in tracking young worker fatality trends at the state level.

Numbers

Six cases of fatal occupational injuries to young people in Massachusetts were identified by the FACE project during 1993–2001.

How Your State May Differ

All states participate in the BLS Census of Fatal Occupational Injuries. Only 15 states conduct in-depth FACE investigations of teen worker fatalities, although NIOSH conducts these investigations in some additional states. The confidentiality of data on fatal occupational injuries used by the CFOI and FACE programs varies by state. FACE or CFOI staff can provide direction on publicly available fatality data with personal identifiers. In Massachusetts, death certificates and several other data sources used by FACE and CFOI are public information, and TAW has access to the publicly available data on work-related fatalities.

In states in which CFOI data cannot be obtained and FACE programs do not exist, the death certificate file may be used to identify fatal occupational injuries to working teenagers by searching ‘‘age at death’’ and ‘‘injury at work.’’ Nearly 90 percent of occupational fatalities involving working youth 16 and 17 years of age can be identified in this way.⁴ It is uncertain whether the same holds true for younger workers. Death certificates will also provide some information about industry and occupation.

Resources

A description of the FACE program, a list of participating states, and a collection of FACE reports are available on the NIOSH Web site, available at www.cdc.gov/NIOSH/face/faceweb.html. Information about CFOI may be found at www.bls.gov/iif.

Other Data Sources

TAW uses several additional sources of data to identify cases of work-related injuries to teens.

- Massachusetts law requires hospitals to report burns covering more than 5 percent of the body to the **Massachusetts Burn Registry** in the state Fire Marshall’s Office for purposes of tracking arsonists. MDPH has legal access to these data. The Massachusetts Burn Registry routinely reports work-related injuries to OHSP by telephone or confidential fax.
- Individual physicians** occasionally report work-related injuries to TAW by telephone or confidential fax.

IV. Case Follow-Up

“A Sentinel Health Event (SHE) is a preventable disease, disability or untimely death whose occurrence serves as a warning signal that the quality of prevention and/or therapeutic medical care may need to be improved.”⁵

One of the objectives of the TAW surveillance system is to identify sentinel cases of work-related injury to young workers. These sentinel cases can identify worksites where hazards need to be eliminated and provide an opportunity to learn more about how and why injuries occur. Information from follow-up on sentinel cases is also used to develop compelling case studies that complement summary statistics generated by the surveillance system.⁶ In addition, case follow-up activities enable TAW to identify teens who are willing to speak to the media to help educate teens, parents, and policymakers about occupational safety.

Overview

TAW conducts follow-up telephone interviews, using a structured questionnaire with approximately 100 injured teens each year. The interviews have the following purposes:

- To further describe the incident and the injury
- To document factors that may have contributed to the incident
- To assess if hazards are still present and if other workers are at risk

On the basis of the information obtained, TAW may decide to conduct a nonregulatory investigation of the workplace to learn more about factors leading to the injury, which can be used to develop recommendations to prevent similar incidents in the future. Select cases may be referred to other agencies for further worksite investigations, such as OSHA or the Wage and Hour Division of the U.S. Department of Labor, which enforces federal child labor laws. Summary data from the interviews are also analyzed to further describe the incidents and the impact of work related injuries on teens.

Selecting Cases for Follow-up

In theory, every work-related injury to a teen is a sentinel event—a warning that others may be at risk in the same workplace. Given the number of cases reported to the surveillance system each year, it is not possible to investigate every case.

TAW initially intended to conduct interviews only with teens who had serious injuries. It rapidly became evident that, with some exceptions, it was not possible to determine the severity of the injuries based on data reported to the surveillance system. While some injuries, such as amputations and leg fractures, can be considered serious by definition, it is impossible to know whether a “burn” or a “cut” is minor or severe. To solve this problem, TAW has defined several types of injuries as severe and attempts to interview all cases with these injuries. These injuries include amputations, fractures and dislocations (except to fingers and toes), concussions, chemical burns and exposures, and multiple injuries.

TAW also targets for interviews all cases in selected subgroups which are defined by industry, employer, or nature of injury. Different subgroups have been targeted sequentially over time. (See Table 1.) The reasons for choosing subgroups vary. For example, TAW has targeted the following:

- **Teens injured in construction**, because there is a policy debate as to whether teens should be prohibited from working in construction, and U.S. Department of Labor has specifically requested information about injuries to teens in this industry
- **Teens injured working for temporary agencies**, because TAW summary data suggests that teens working for such agencies may be at high risk

- **Teens with cuts**, because random interviews suggested that cuts and laceration injuries are more serious than the TAW staff had originally assumed

TABLE 1

Examples of Subgroups of Cases Targeted by TAW for Follow-up Interviews

Industry/event targets Injury targets

Construction Burns

Temporary agencies Cuts and lacerations

Retail bakeries Back sprains

Assaults Hernias

Needlesticks

It is important to attempt to interview all cases in the targeted subgroups so that the summary data are representative of the subgroups. Initially, TAW had no real system for targeting cases for interviews other than those that were defined as serious. The staff chose those that “looked interesting.”

However, it quickly became clear that the results of these interviews could not be generalized. TAW now tries to complete at least 50 interviews in each targeted subgroup. Summary findings are presented as data from a case series.

How Your State May Differ

The choice of specific subgroups of injured workers targeted for follow-up is likely to vary by state depending on the types of industries in which teens are employed, state-specific policy issues such as proposed changes in job prohibited under state child labor laws, and resources available for follow-up activities.

Case Tracking

Once a decision is made to follow-up on a case, a hard copy of the case-tracking form is attached to a copy of the case report. These files are provided to the interviewers. The case identification number is entered into a separate tracking database that includes the interviewer assigned to the case, the number of calls made to the case, and case status (that is, whether the case is still open or has been closed).

Each time an interviewer makes a phone call to a case, the information is recorded both in the individual interviewer’s call log and on the case tracking form. The call log is used to update the case tracking database. The case-tracking form is used to record the details of all case activities, such as the following:

- When the initial letter is mailed
- When the interview is completed
- Referral activity
- Date, time, and results of phone calls
- Completion of data coding for the case.

Any TAW staff member can use the case-tracking form to see what has been done, by whom and when.

Protocol for Conducting Interviews

TAW follows a standard protocol in conducting telephone interviews with injured teens.

1. A letter is sent to the young worker’s parent or guardian describing the project and indicating that TAW will be calling to request permission to interview the injured teen. Materials sent with the letter include a fact sheet describing the project and indicating that the information from the interview may be used in creating anonymous case studies to be used in educational materials and training.
2. A telephone call is made to the parent or guardian to obtain this permission. If the parent is not reached on the first call, two additional attempts are made.
3. If the parent or guardian grants permission to interview the teen, the teen is interviewed by telephone. If the teen is not reached on the first call, two additional attempts are made.

4. After the interview, a thank you letter and educational materials are sent to the teen.

The telephone interview is conducted using a structured questionnaire. It takes about 15 to 20 minutes to complete.

Resources

Examples of follow-up materials, including the interview instrument, can be found in Appendix D.

Interview Data Elements

The key data elements collected in these interviews include the following:

- **Demographic information**, such as birth date, age at injury, race/ethnicity, and language spoken at home
- **Employment information**, such as employer, occupation, date job started, and whether the job is a school or temporary agency placement
- **Incident information**, including if the worker was performing his or her usual task when injured, time of day when the injury occurred, how long a shift the teen had been working on the day of the injury, how long had the worker been employed at that job when the injury occurred, and if a supervisor was present when the injury occurred
- **Injury information**, including the nature of injury and body part injured
- **Medical care**, including the type of facility where teen was treated, medical treatment received, and hospitalization information
- **Impact of injury**, including the number of missed days of usual activities, lost workdays, lost school days, continuing symptoms or restrictions at the time of interview, and anticipated permanent effects
- **Other information** on health and safety training at work, whether the teen had a work permit and/or had received information at school or work about the child labor laws

At the end of the interview, the injured teens are also asked if they have any concerns about TAW contacting their employers and if they have any ideas about how their injuries might have been prevented. Over the years, TAW has received numerous requests from the media for teen injury data and also for names of teens who would be willing to tell their stories to reporters. At the end of the interview, TAW now also asks teens whether or not they would be willing to speak to the media about their experiences.

A Note on Mailed Questionnaires

TAW has recently undertaken a project to assess the feasibility of collecting information about work-related burn injuries using a mailed questionnaire. The TAW staff developed a short questionnaire (included in Appendix D) based on the telephone questionnaire and results from a previous burn case series. Questionnaires were mailed to parents of 62 teens that had burn injuries reported, who were asked to forward the questionnaires to their teens. Nonrespondents were followed up by mail and, if still they did not respond, by phone.

The response rate was similar to that of the telephone survey—about 50 percent of eligible cases. Females were more likely than males to respond to both the mailed and telephone surveys. The data collected in the mail survey was somewhat less complete than that collected through telephone interviews, although some minor changes in the mailed questionnaire would likely improve data completion and quality. Mailed questionnaires appear to be a feasible and lower-cost method of obtaining a limited set of data on select injuries. This approach to conducting case follow-up needs to be further explored for different types of injuries.

Interviewers

TAW uses part-time interviewers, who work in the afternoons and early evenings. Many of the interviewers are college or graduate students who can establish rapport with teens. The interviewers are trained and supervised by TAW staff members who review and code all the interviews. Interviewers also help with data entry.

Training the interviewers generally takes about eight hours over the course of two days. The interviewers are told about the program, the interview process, and walked through the questionnaire one question at a time. A mock interview is conducted. A TAW staff member or a more experienced interviewer observes the first few interviews a new interviewer completes. Completed interviews are reviewed regularly by the TAW staff and feedback is provided to interviewers as necessary. The TAW staff has found it helpful to sit down with a new interviewer and code some of the interviews he or she has completed. This helps the interviewer better understand the type of information that is most useful for coding. In addition to training on the interview instrument the interviewers, like all TAW staff, are trained regarding confidentiality policies and HIPAA.

What Is Done with Sentinel Case Information

Research-Oriented Worksite Investigations

Sentinel case data are used to target research-oriented (non-regulatory) investigations of workplaces to learn more about factors leading to injuries that can be used to develop recommendations to prevent similar injuries. All young worker fatalities are investigated by the Massachusetts FACE program. The TAW staff assists in these FACE investigations. FACE investigators follow standard protocols established by NIOSH in conducting these investigations. Each investigation results in a narrative FACE report that describes the incident and includes recommendations for prevention. These reports—or shorter versions called *FACE Facts*—are disseminated widely throughout the state to employers, trade associations, unions, and safety professional and advocates. (Appendix E includes a sample FACE report, FACE Fact Sheets and the FACE data collection instrument for young worker fatalities.)

The TAW staff also conducts a limited number of research-oriented worksite investigations of nonfatal teen injuries (fewer than five cases per year). These investigations have helped elucidate specific hazards in a number of cases. For example, after identifying an unusual number of burn injuries among teens employed in retail bakeries, TAW conducted several on-site investigations and identified specific problems with coffee makers that led to a change in equipment design (see Section VI., Prevention).

TAW has also encountered obstacles in conducting these investigations—for example, the following:

- The lag time between the time the injury occurred and the time the interview is completed is often substantial, which means memories about the event fade (especially on the part of the employer).
- Because the name of the individual teen is confidential, TAW cannot mention the teen's name to the employer unless express permission has been given by the teen to do so. Without using the teen's name, it is usually not possible to conduct these investigations in workplaces, such as large grocery stores, that employ many teens.
- The injured teen's and employer's versions of the incident often conflict.

TAW has explored two approaches to conducting these non-fatal injury investigations:

- ***Incident investigations*** that focus on the circumstances surrounding a specific injury. These are most likely to be successful when there is a serious injury and a short lag time between the incident and the investigation.
- ***Hazard investigations*** that focus on the presence of hazards for teens in the work environment. They also provide an opportunity to assess employer practices and attitudes regarding working teens. This type of investigation is more appropriate when the injuries are less serious and there has been substantial lag time between the incident and the investigation.

While conducting these investigations can prove challenging, the information can be invaluable in identifying hazards and potential solutions.

Referrals to Other Agencies

Sometimes the data or the interview with the injured teen leads the TAW staff to believe that specific health and safety standards or child labor laws have been violated. In these cases—which are a small proportion of all cases identified—TAW may refer the case to either OSHA or either the state or federal child labor law enforcement agency. TAW has working relationships with these agencies and has developed protocols for referring cases. OSHA provides TAW with feedback on investigations conducted as a result of teen injury referrals. Because state child labor laws in Massachusetts are enforced through criminal (as opposed to civil) proceedings, it has been difficult to obtain any feedback from the state Attorney General’s Office that conducts these investigations. The decision to involve a regulatory agency based on a reported health event is a complex one. It involves considerations of patient confidentiality and a teen’s fears about job security. In all but the most serious injury cases, referrals are not made without first discussing the referral with the teen. The names of the injured individuals are never released without their permission.

Summary Data Analysis and Case Studies

Summary data from the interviews are analyzed to further describe the experiences of injured teens. These data provide otherwise unavailable information on the extent to which young workers receive worker health and safety training, compliance with work permit requirements, and the impact of work injuries on teens. (For examples of findings from interviews, see Figure 6, page 29)

Information from the interviews—and from worksite investigations, when available—are also used to create case studies. These case studies are used as examples in reports, oral presentations, educational materials, and trainings. The combination of the summary information and the case studies can be powerful in convincing agencies and policymakers about the need for programs and policy changes to protect young worker health.

Protecting the Confidentiality of TAW Cases

Addressing confidentiality considerations is an essential and often time consuming aspect in developing a surveillance system. The personal identifiers of the TAW cases (name, addresses, birth date, zip code) reported to the surveillance system are considered confidential under state and federal privacy laws and are not released without permission of the individual. The confidentiality of employer name varies by data source. For example, employer name reported by hospitals is not a confidential data element, whereas our data sharing agreement with the Department of Industrial Accidents states that employer information shall not be released to others.

MDPH has standard procedures and policies in place to protect data confidentiality. These include among others, password protected electronic files, locked file drawers for hard copy records, and cell size restrictions in publishing aggregate data. The fax machine that is designated for receiving individual TAW case reports is located in a locked office. Case reports of teen injuries that are written up and included as examples in publications contain neither personal nor employer identifiers and are written up in general terms. Interviewed cases are informed prior to the interview that their stories may be used for this purpose.

All MDPH staff and contracted employers, including TAW interviewers, receive confidentiality training and contracted employees sign data confidentiality agreements prior to beginning employment. Only designated TAW staff in the Occupational Health Surveillance Program have access to the confidential TAW files.

V. Data Management, Analysis, & Dissemination

Summary analysis of the cases reported to TAW provides important information about the magnitude and distribution of work-related injuries to teens. This information is useful in mobilizing support for and targeting broad-based prevention activities. The summary analysis provides an overview of the types of injuries sustained by working teens as well as the occupations, industries, and communities in which working teens are at risk. Because employer names are collected by this surveillance system, summary analysis can also identify workplaces in which multiple teens have been injured and intervention is warranted. And as discussed above, summary analysis of interview data provides additional information about the circumstances in which working teens are injured, as well as the impact of these injuries on their lives.

TAW Databases

TAW uses three databases (created in Microsoft Access) to store and manage its data.

1. Workers' Compensation Database

This database contains a record for each case identified through workers' compensation records. Every quarter, TAW receives computerized data on the workers' compensation claims filed by teens from the Department of Industrial Accidents (DIA). These new cases are appended to the previous file. The DIA board number is used as the case identification number. The data elements received from DIA for each case are listed on page 6. The TAW staff adds (a) an "age at injury" variable, calculated by subtracting the injury date from the birth date, and (b) variables for codes that are assigned as described under data coding, below.

2. Case Report Database

This database contains a record for each case identified through sources other than workers' compensation records. Most of these cases are identified through hospital emergency departments. All data for cases are manually entered when the reports are received. Each case is assigned a unique case report identification number. As with the workers' compensation database, TAW adds variables for "age at injury" and for the codes assigned as described in the data coding section, below.

3. Interview Database

This database includes a record for each case for which a follow-up interview is completed.

Information from the questionnaires is entered into the database after the questionnaires are completed and coded. Cases in this database can be linked back to the source file (either the case report or the workers' compensation database) using the unique identification number assigned in those databases.

Data from the workers' compensation and case report databases are periodically merged to create a database for comprehensive data analysis. Basic analyses (frequencies and cross-tabulations) are performed using Access, while more complicated analyses (rates) are performed in SAS.

Data Cleaning

"Cleaning" data is a time-consuming process that involves identifying and eliminating duplicate cases, identifying inconsistent or incorrect information that needs to be addressed, and editing the spelling of key data fields that include text such as employer name, so that searches can be conducted using information from these fields. Each of these tasks is briefly discussed below.

Duplicate Cases

In TAW, a “case” is an injury, not a person. If a teen sustains more than one work-related injury at different points in time, each discrete injury is counted as a separate case. For example, a burn injury to a teenager in July is a separate case from a laceration sustained by this same teenager in January. Each case should appear once and only once in a database. The protocol for eliminating duplicates varies with each database.

When the quarterly electronic data are received for the workers’ compensation database, the entire database is sorted by name and checked for duplicates to ensure that a case is not reported more than once. When there is a match on name, other variables are reviewed (date of birth, type of injury, date of injury, employer) to determine if the second record is a duplicate. If the case is a duplicate, information from all the records are compiled into a single record. In cases of inconsistent information among duplicates, the information from the most recent record is used.

The process for eliminating duplicates from the case report database is different. Cases from emergency department reports indicating a teen worker received “initial treatment” are entered into the database. If the reports indicate that a patient received both initial and follow-up care at the emergency department, only the initial visit is entered. Occasionally, the initial hospital visit went unrecorded and only a follow-up visit is reported. In these cases, the follow-up visit is entered in the database. As with the workers’ compensation data, the entire database is periodically sorted by name to identify and eliminate duplicate cases.

Overlap Cases

Overlap cases are cases that are included in both the workers’ compensation and case report databases. Such cases are identified by periodically merging the workers’ compensation and case report databases and matching on last name. When a match on names is revealed, other variables (such birth date, injury type, injury date, and employer) are compared. When inconsistencies appear in a case that is included in both databases, TAW considers the workers’ compensation data to be correct, since these records are more extensive than hospital records. Only about three percent of all cases overlap. They are coded as “overlap cases” in both the workers’ compensation and case report databases.

Incorrect Information

Computerized “edits” are run on the workers’ compensation and case report databases to identify cases that should not be included. For example, cases involving individuals over the age of 18 are identified and eliminated. Additional information is requested from data providers for cases involving persons under 14 years of age to verify whether the person was actually younger than 14 when injured and whether the injury actually occurred while the child was working.

Spelling Corrections

Fields that contain text, such as employer name, require a considerable amount of cleaning before they can be used for analysis. For example, a search to identify the number of injuries that occurred in “McBains” requires that the corporate name be spelled the same way each time it is entered in the database. A search for McBains will not identify cases in which the corporate name is spelled “MacBains” or “MB.”

Data Coding

Selected data elements (variables) are coded using standard classification systems, described below.

Industry

Industry refers to the type of business where the teen was employed when injured (for example, a restaurant, hospital, or grocery store). The standard industrial classification (SIC) system is used to

classify workplaces (also known as establishments) by industry based on employer name. SIC codes are researched and included in all three databases.

TAW staff use several resources to look up employers' SIC codes. (See box below.) Some employers have multiple SIC codes. For example, a retail bakery that manufactures donuts may have different codes for its retail and manufacturing functions. In these cases, the job title is used to determine which SIC code should be assigned. If job title does not prove helpful in choosing a SIC code, TAW uses the primary SIC code (i.e., the first listed). If an employer's SIC code cannot be identified using one of the available resources, the TAW staff researches the company on the Web or in the telephone directory and applies a SIC code to that establishment.

It should be noted that SIC is an outdated system and being phased out in favor of the North American Industry Classification System (NAICS). Since 2003 TAW began using NAICS codes.

SIC Code Resources

TAW uses the following resources to determine the proper SIC code for establishments.

American Business Directories: Available on compact disc from Directories USA. This is one of a number of commercial products allowing users to search for SIC codes for specific employers. (www.directoriesUSA.com)

The Massachusetts Employer Listing: An electronic listing of over 70,000 private sector Massachusetts establishments compiled by the Massachusetts Department of Employment and Training (MDET) that includes SIC (and NAICS) codes for each establishment. The codes are assigned by MDET and based on the information provided by employers when they register with the unemployment insurance system. The database is made available to MDPH through an agreement with MDET.

Standard Industrial Classification Manual: Published by the Executive Office of the President of Management and Budget in 1987. This is the basic guide for assigning SIC codes. A searchable version of the SIC Manual, the SIC System Search is available at the OSHA Web site (www.osha.gov/oshstats/sicser.html).

Occupation

Occupation refers to the teen's job title, such as cashier, cook, or house painter. Occupation codes are researched and included in all of the databases. TAW uses the U.S. States Census Bureau Occupational Classification System to classify occupations based on the job title and/or job description.

The TAW staff is trained to apply the classification scheme. Unfortunately, the occupation data in the workers' compensation and case report databases are often incomplete. For many cases occupation are not provided or are listed as "student."

Resolving Job Title Discrepancies

TAW noticed that teens working in retail bakeries and quick service restaurants often had different job titles even though they performed the same tasks. Interviews with teens confirmed that teens with the job titles of counter person, cashier, clerk, or crew worker often performed the same tasks. Yet these four jobs had different occupational codes. Thus, TAW staff decided to use the same code (438—food counter, fountain and related occupations) for all teens working in retail bakeries or quick service restaurants with one of those job titles.

Injury Descriptors

TAW uses the Bureau of Labor Statistics Occupational Injury Illness Classification (OIIC) scheme to classify individual injuries. The OIIC is a five part coding system that includes codes for nature of injury or illness, part of body directly affected, source of injury or illness, event or exposure, and secondary source of injury or illness (www.bls.gov/iif/oshwc.htm).

The TAW staff is trained in using the OIIC system. OIIC codes for nature of injury and body part are applied by the TAW staff and included in the workers' compensation, case report, and interview databases. Codes for source of injury and event are included in the interview database only.

OIIC and ICD Codes

The OIIC system is an adaptation of an earlier American National Standards Institute (ANSI) injury coding system used to code employer injury logs required under the Occupational Safety and Health Act. ANSI codes can be readily converted to OIIC codes. Many states, including Massachusetts, use the older ANSI system to code workers' compensation data. TAW elected to use the OIIC system because the nature of injury and body part codes in workers' compensation data could be readily converted to OIIC codes. Unfortunately, there is no direct correlation between OIIC codes and the ICD codes (that is, nature-of-injury and external cause- of-injury codes) often used by injury researchers and included in hospital data systems.

Hospitals in Massachusetts use the ICD system to code injury data. However, the case report data submitted to TAW by emergency departments is usually submitted with narrative text describing the type of injury (e.g. cut, fracture) prior to ICD coding. The TAW staff uses this narrative text to assign OIIC codes to emergency department data.

Data Analysis

TAW data are analyzed using simple statistical measures. Frequencies and cross-tabulations are generated. Injury rates are also computed to measure the probability or risk of teens sustaining work related injuries within a given time period under study. An industry that employs a large number of teens may experience a relatively large number of teen injuries, yet the injury rate for that industry may be fairly low. In turn, an industry that employs a relatively small number of teens may have fewer teen injuries but a higher teen injury rate. Both rates and numbers of injuries need to be taken into account in targeting and evaluating prevention efforts.

Frequencies

The first step in analyzing TAW data is to generate simple frequency distributions for age, sex, race and ethnicity, industry, and geographic area—city, county, or public-use microdata area (PUMA), which is the smallest geographic unit in the 5 percent microdata sample of the U.S. Census.

Multiple Versus Single Data Source Surveillance

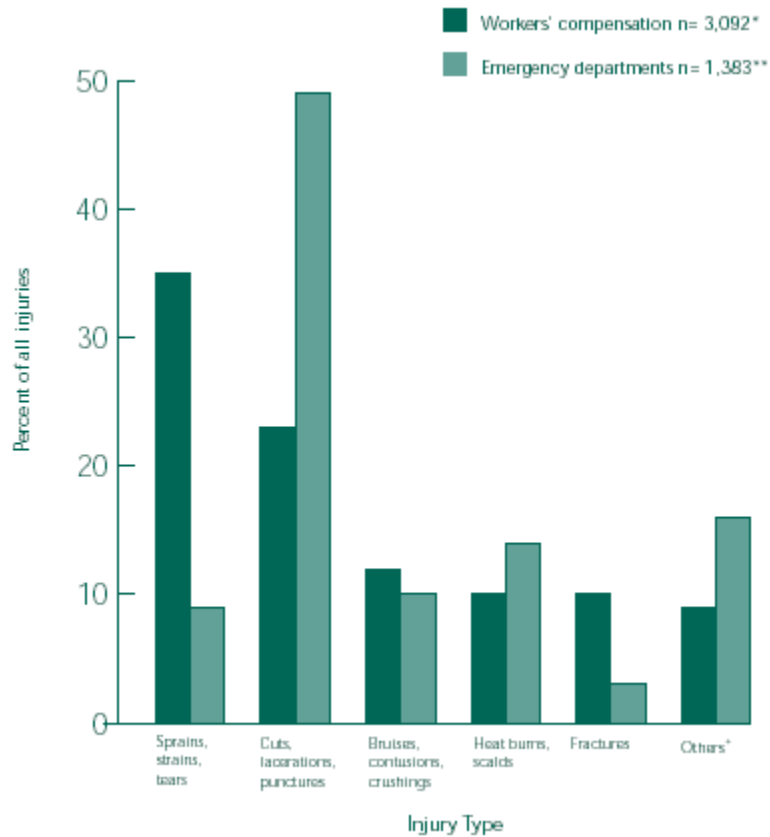
The workers' compensation data collected by TAW includes all teen injuries for which lost work time claims have been filed in Massachusetts. However, TAW collects data from only a convenience sample of 11 of 80 hospitals; these data are not necessarily representative of all teen work injuries seen in emergency departments in Massachusetts and statewide estimates cannot be extrapolated from the sample. TAW determines the overlap in reporting between the two data sources, computes frequencies for ED and workers' compensation cases separately, and compares the results. Because ED data are not necessarily representative, rates are computed using workers' compensation cases only.

The overlap between the workers' compensation and ED cases is only about 3 percent. Many ED cases are not captured in the workers' compensation data either because the teens were ineligible for workers' compensation lost time pay (i.e., not covered by workers' compensation or the teens did not miss five or more days of work as a result of their injuries) or were eligible and did not file claims. The distribution of injuries by injury type and industry vary markedly by data source (see Figures 2 and 3, below). These findings highlight two critical surveillance lessons:

- What one sees is highly dependent on the data source.
- Multiple data sources are needed to fully characterize the extent and nature of the young worker injury problem.

Although these rates do not measure the full extent of the problem, they can provide valuable information about injuries resulting in lost work time, which can be used to target prevention efforts.

Figure 2. Occupational injuries to young workers by injury type and data source, Massachusetts, July 1993–2000

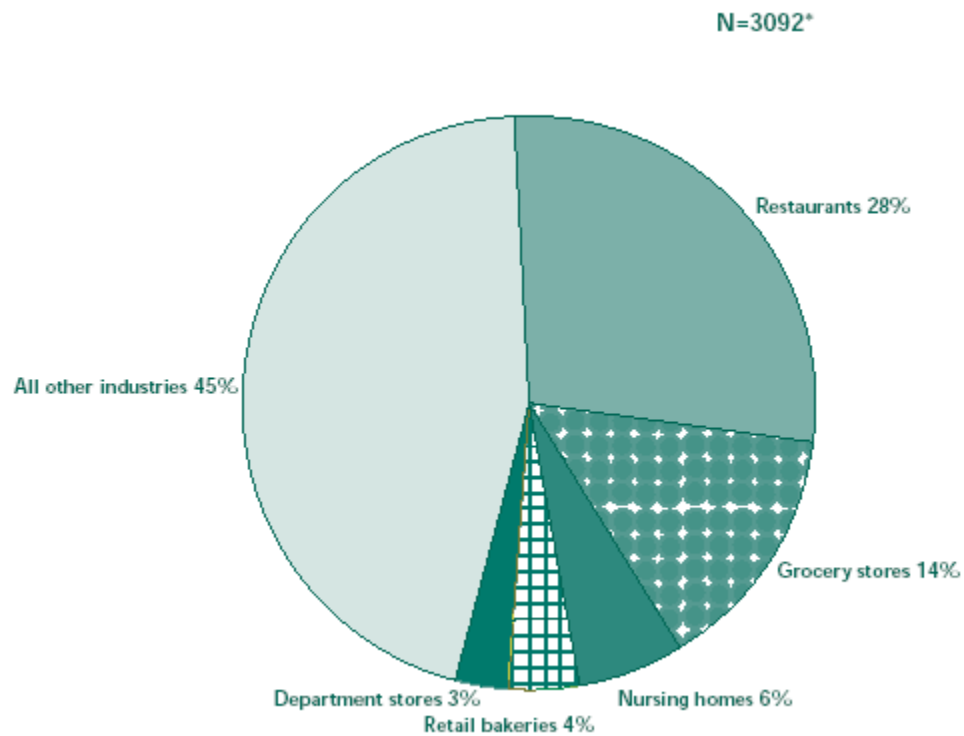


Source: Massachusetts Department of Public Health 3/2002

*Type of injury missing for 291 cases **Type of injury missing for 128 cases

+Includes 17 amputations

Figure 3. Occupational injuries to young workers by selected industry, Massachusetts, July 1993–2000, based on workers' compensation data

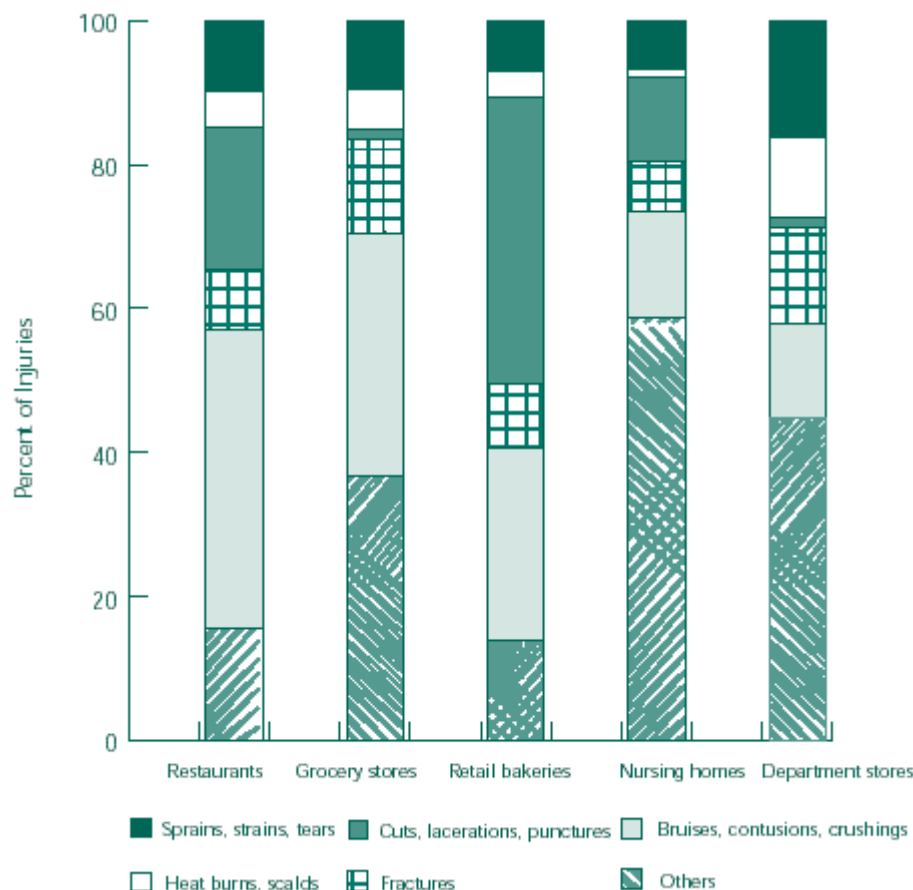


Cross-Tabulations

After simple frequencies are tabulated, cross-tabulations are generated to provide a more detailed understanding of the problem. Useful cross-tabulations include nature of injury with body part, nature of injury with industry (or employer), nature of injury with gender, and industry by geographic area.

For example, cross-tabulating the nature of injury and industry pinpoints the types of injuries that characteristically occur in specific industries. Such information not only helps identify industries in which intervention is needed, but also helps define the type of intervention that can correct this problem (see Figure 4).

Figure 4. Occupational injuries to young workers for the top five Industries by industry type, Massachusetts, 1993–2000



Employer-Based Analysis

TAW periodically computes frequencies of injuries by employer to identify establishments where multiple injuries have occurred. Cross-tabulations can provide more detailed information about the types of injuries in specific establishments or chains of establishments that can inform targeted intervention efforts.

Injury Incidence Rates

Calculating teen occupational injury rates requires reliable and appropriate numerator data on the number of teen worker injuries that occurred during a specified time period and denominator data on teen employment for that period.

As discussed in the box ‘multiple versus single data source surveillance’, TAW currently uses only teen injury cases identified through workers’ compensation records in the numerator when computing rates because these records are a complete census of all claims filed by teens. TAW computes teen occupational injury rates based on workers’ compensation cases for the state as a whole, by industry (defined at the three-digit SIC code level) and by geographic area (public-use microdata area). (Technically, these rates are “workers’ compensation claim rates” rather than injury rates.)

Data on teen employment during the surveillance period is needed to use as the denominator in computing teen occupational injury rates. Finding appropriate data on teen employment at the state level is a

challenge. TAW has explored use of two different sources of statewide employment data for computing rates:

1. The United States Census. The Census Bureau conducts a national census every 10 years, collecting basic demographic (age, gender, race, ethnicity) and housing information for everyone. For a 15 percent sample, employment information is collected for those 15 years or older. Employment variables include: employment status, current industry, occupation, hours worked per week, and weeks worked during the previous year. Data from this long form is used to generate the 5 percent census sample. Data from this 5 percent sample can be used to estimate the statewide number of workers and full-time equivalents (FTE's) by industry and occupation for 16- and 17- year - olds. The limitation of using census data is that the information is only updated every 10 years. Youth employment patterns may vary in the interim.

2. Current Population Survey. The Current Population Survey (CPS) is a monthly survey of about 60,000 households nationwide conducted by the Census Bureau for the Bureau of Labor Statistics. It provides a comprehensive data set on the labor force, employment, unemployment, and persons not in the labor force. Data on industry, occupation, weeks worked, and hours worked per week in the past year are available for people 15 years of age and older. While the CPS provides reliable data for computing teen injury rates at the national level, the sample in many states is too small to provide reliable estimates of teen employment broken down by industry or occupation.

A Note on Denominators

The number of workers employed is often used as the denominator in calculating occupational injury rates. However, for groups who typically work part-time (like teenagers), ‘‘hours worked’’ (which is usually expressed as ‘‘full-time equivalents’’ or ‘‘FTEs’’) is a more appropriate denominator. Failure to accurately portray the numbers of hours worked can result in underestimating the risk of injury for part-time employees.⁷

For example, over a year, Company A employed 100 adults full time (that is, for 40 hours each week) and 100 teens part time (for 10 hours each week). During this year, 10 adults and 4 teens were injured. Based on the number of employees, the annual injury rates were 10 injuries per 100 adult workers per year and 4 injuries per 100 teens each year. This makes it appear that teens were safer than adults. However, each teen only worked one-quarter of the adult work week—and thus was only exposed to the risk of injuries on the job for one-quarter of the time each adult was exposed. If the teen injuries are multiplied by four, we discover that, had the teens been working full time, they could have been expected to incur 16 injuries at a rate of per 100 FTEs—60 percent higher than the rate of injuries for adults.

Figure 5. Top ten industry ranked by average annual occupational injury rate* to 16- and 17-yearolds and number of injuries, Massachusetts, 1993–2000

Industries with the highest injury rates

Industry	Annual rate (number/100 FTEs)	Number of cases
Trucking/Courier	8.7	95
Personnel Supply Services	3.9	30
Retail Bakery	3.9	157
Nursing Home	2.1	165
Social Service	1.9	19
Restaurant	1.8	709
Retail Lumber	1.4	18
Entertainment & Recreation	1.3	79
Grocery Store	1.3	398
Hotels and Motels	1.1	25
All Industries	1.1	

*Rates are provisional

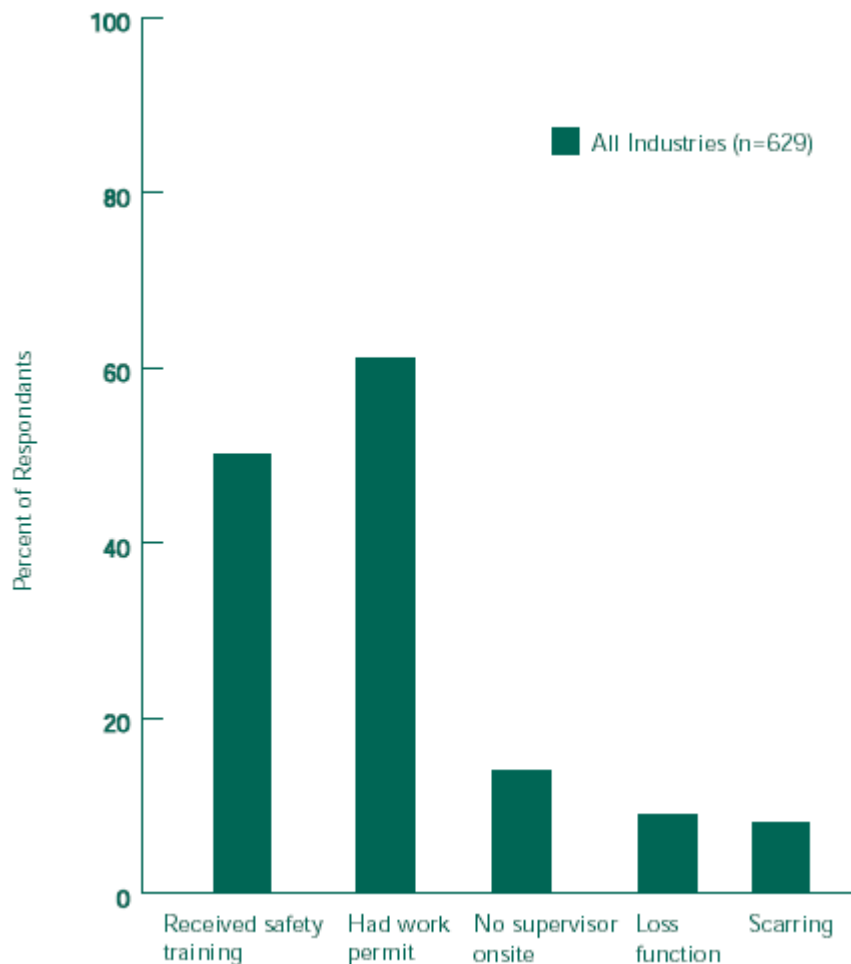
Industries with the greatest number of injuries

Industry	Number of cases	Percent
Restaurant	709	26.7
Grocery Store	398	15.0
Nursing Home	165	6.2
Retail Bakery	157	5.9
Department Store	126	4.7
Trucking/Courier	95	3.6
Entertainment & Recreation	79	3.0
Hospital	53	2.0
Drug Store	46	1.7
Personnel Supply Services	30	1.1

Follow-up Interview Data

Analysis of the teen interview data provides important information about the circumstances of injury, health and safety training, and impact of injury on teens that is not available from the other sources of data. TAW uses simple frequency calculations and cross-tabulations to analyze key data elements in the interview database. Because only selected cases are targeted for follow-up interviews, it is important to present these findings as case series data rather than population-based data.

Figure 6. Interviews with teens injured at work in Massachusetts, July 1993–2000



The Interview Narrative

The narratives in the teen follow-up interviews provide additional important information. For example, many teens interviewed sought emergency care only after they had completed their work shifts, rather than immediately after their injuries. This finding raises questions about the adequacy of emergency response procedures in their workplaces. TAW is exploring approaches to qualitative data analysis that will enable us to take full advantage of the teen narratives.

Data Dissemination

Data needs to be disseminated if it is to have an impact and be used to prevent teen injuries. It is also essential to present surveillance findings to those who contribute data to the system to demonstrate that their efforts are valuable and to encourage continued reporting. TAW distributes its data in a number of ways to those within the Massachusetts Department of Public Health, to other government agencies, the agencies and institutions that contribute data to the system, and others in the community who can have an impact on teen worker safety.

TAW publishes an annual newsletter that includes summary data from the surveillance system as well as other state, local, and national news about health and safety of teens at work (see Appendix F). The newsletter is disseminated to over 2,000 individuals. The newsletter is also included in mailings sent out by the Injury Control and Prevention Program in MDPH.

In addition to the newsletter, fact sheets have been developed for the five industries with the greatest number of cases identified by the surveillance system: department stores, grocery stores, nursing homes, retail bakeries, and restaurants. These fact sheets are available on the OHSP Web site and are given to employers in those industries when investigations are conducted.

Surveillance findings have also been presented at national and international conferences as well as local meetings. TAW findings were cited in an Institute of Medicine Report, *Protecting Youth at Work*, (National Academy of Medicine, 1998), and the CDC NIOSH *Worker Health Chartbook, 2004* (CDC NIOSH, DHHS(NIOSH) Publication No. 2004-146, September 2004). The TAW staff regularly responds to media requests for information about risks for youth at work. Reporters are typically interested in both statistics and in contacting injured teens about their individual stories. TAW staff members are in the process of writing several journal articles summarizing surveillance findings. One of the practical challenges facing TAW staff is finding time to write articles for peer reviewed publications.

TAW Newsletter Mailing List

The TAW newsletter mailing list includes the following:

- Key contacts in other government agencies, including OSHA regional and area offices, U.S. Department of Labor Wage and Hour Division, Massachusetts Department of Education School to Career and Vocational Education, Massachusetts Attorney General's Office, Massachusetts Department of Industrial Accidents, and Massachusetts Department of Labor and Workforce Development
- All Massachusetts emergency department directors and nurses managers
- Key contacts in high schools, including school superintendents, high school principals, school health coordinators, school-based health center staff, school to career liaisons, vocational educational directors, and technical vocational co-op coordinators
- Staffs of youth-serving agencies such as YMCA and Boys and Girls Clubs
- Pediatric and adolescent health care providers
- Massachusetts chapter of the American Academy of Pediatricians
- Individuals physicians who have reported cases
- The OHSP Advisory Board
- Labor union and industry contacts
- Occupational health and injury control experts in universities, private, and non-profit organizations such as the Massachusetts Safety Council
- Media contacts
- State legislators on relevant committees
- Public health programs within MDPH, including Injury Control and Prevention, Adolescent Health, School Health, Young Men's Programs, and Environmental Health
- Individuals who have requested information or materials about young workers safety

VI. Prevention

TAW data allows OHSP and its collaborators to respond more effectively to the young worker injury problem in Massachusetts. National data, however good, may misrepresent the problem in a particular state. TAW data identifies not only the industries and occupations where teens are at risk in Massachusetts, but often where and how these young people are being injured. It enables OHSP and its collaborators to develop targeted prevention strategies that respond to the communities, industries, and occupations in which young people are injured in Massachusetts—and even take steps to correct specific job hazards in specific workplaces identified by the surveillance system.

State and local data can help convince policymakers, government agencies, private organizations, advocates, and parents to work together and take action to protect young workers. OHSP and its collaborators have made extensive use of TAW data to educate policymakers and the public about injuries to young workers in Massachusetts.

Using Data to Identify Communities for Prevention

In 1996, OHSP analyzed young worker injury data by region and identified an area around Brockton, a city in southeastern Massachusetts, as having a high rate of injuries among its teen workers. Using these data, OHSP, working in collaboration with the Education Development Center, Inc. (EDC), was able to obtain NIOSH funding for a three-year effort to develop a community-wide young worker safety project in Brockton. The goals of the project were to (1) provide teens and employers with information on workplace safety and (2) engage those responsible for the health and safety of young people in efforts to improve protections for working teens. Local data was essential in convincing employers, elected officials, school personnel, and others to become involved in the project.

OHSP and EDC worked with teens, school personnel, youth-serving organizations, cultural and civic associations, businesses, health care providers, and government officials to develop educational materials and integrate information and training about occupational safety into their activities.

Information generated by TAW was invaluable in creating educational materials that both targeted real needs in the community and were relevant and compelling to their intended audience. For example, the follow-up interviews with teens revealed that many were not familiar with the child labor laws or specific workplace hazards and how to prevent them. OHSP, EDC, and their Brockton partners developed educational materials responding to identified needs for teens, parents, employers, and health care providers. See box below for list of materials. In addition, OHSP and EDC developed Safe Work/Safe Workers, a three-hour introductory curriculum on workplace health and safety for high school students (see Appendix F). These materials are still used by TAW and have been adapted for use in other states.

TAW continues to use surveillance data to guide development of educational materials. For example, when surveillance findings revealed that many eligible teens may not file workers' compensation claims, OHSP collaborated with the state workers' compensation agency to develop *Under 18 and Hurt on the Job? Information on Workers' Compensation*, a brochure informing teens about their rights and the procedure for filing claims. Given findings that emergency response in restaurants is often inadequate, TAW developed a poster, "First Aid for Burns in Restaurants," disseminated in conjunction with the Massachusetts Restaurant Association and by health officer inspectors in cities and towns throughout the state.

Materials Available from the Massachusetts Department of Public Health's Teens at Work: Injury Surveillance and Prevention Project

Are You a Working Teen?

Pamphlet for teens contains child labor laws and related information. (2002)

Under 18 and hurt on the job?: Information on Workers' Compensation

Pamphlet for teens on workers' compensation. (2002)

Massachusetts Employers' Guide: Young Worker Health & Safety and the Child Labor Laws

Recommendations for employers and a poster of the child labor laws applicable in Massachusetts. (2003)

Protecting Your Working Teen: A Guide for Parents

One sheet version of former pamphlet containing child labor laws and related information.

Available in English and Portuguese. (2002)

Protecting Working Teens: A Guide for Health Care Providers

Pamphlet for health care providers with information about child labor laws and what to talk to teens about regarding work. (2003)

Preventing Work-Related Injuries to Teens: Newsletter from the Teens at Work Injury Surveillance and Prevention Project

Biannual newsletter published by the Teens at Work Project. (2001, 2003)

Surveillance Updates: 1993-1999

This is a series of six fact sheets on injuries to teens in Massachusetts between 1993-1999 on each of the top five industries in Massachusetts and one on all industries. (2000)

First Aid for Burn Poster in Restaurants

This is a poster on first aid for heat burns in restaurants available in English, Spanish, and Portuguese. (2004)

Know your Rights

Poster for teens with information about wages, hours, health and safety. (1996)

Work/Safe Workers: A Guide for Teaching High School Students about Occupational Health and Safety

Three-hour curriculum containing short video and learning activities. (1997)

Call 617-624-5632 or email Teens.atwork@state.ma.us for more information.

Using Data to Target Industries

The national data do not always reflect the young worker injury problem in a particular state. TAW has proved valuable for identifying specific industries in Massachusetts in which young people are injured and action can be taken.

For example, an analysis of TAW surveillance data from 1993–1999 revealed both high rates and high numbers of injured teens in the retail bakery industry—an industry that had not previously been identified as high risk for working youth. Further analysis revealed that close to 60 percent of these cases occurred in establishments in a single large franchise retail bakery chain. Although burns accounted for 10 percent of all injuries identified by TAW, approximately 40 percent of the injuries to youth working in retail bakeries were burns. Follow-up interviews were conducted with a sample of teens injured while working in retail bakeries. While these findings were based on small numbers (a sample of 33) they nevertheless helped identify hot coffee as the leading culprit—in particular, hot coffee spilled when removing brew baskets on the coffee machines. In addition, over half of those interviewed indicated that they had never received health and safety training at work, and half indicated that their supervisor was not present on-site at the time of the injury. The interviews also revealed that the procedures for responding to injuries appeared to be a problem.

In February 2000, MDPH presented its surveillance findings at a meeting of the franchise bakery chain. The meeting included corporate headquarter staff as well as hundreds of franchise owners. The data collected by TAW revealed a pattern of burn injury that might not have been revealed by looking at any single workplace. While some owners had been aware of the problems with brew baskets, the summary data on burn injuries was compelling. Since summer, 2001, corporate headquarters, which specifies the

equipment to be used in the franchise stores, has required owners purchasing new equipment to install brew baskets with shields to prevent spillage. Continued surveillance should provide important information about the effectiveness of these interventions.

TAW information has also resulted in improvements in safety in other industries. In 2000, a 16-year-old Massachusetts youth was fatally injured while operating a forklift at a seafood processing facility. Both state and federal child labor laws prohibit youth under 18 from operating forklifts at work. During the FACE investigation of this incident, the employer commented that he did not know about the child labor laws and asked why someone did not inform him about them. The Massachusetts FACE and TAW staffs, who were collaborating on the investigation, came up with the idea of creating a forklift sticker to inform employers and workers about the law. OHSP developed a sticker to be placed on forklifts reading “No operators under 18 years of age. IT’S THE LAW.” Working with the Massachusetts Attorney General’s Office, (which enforces Massachusetts child labor laws) and the U.S. Department of Labor, OHSP disseminated the stickers, together with a brief “FACE Facts” describing the incident, to 600 of Massachusetts’s manufacturers, forklift distributors, and warehouses. A fax form to request additional copies of the sticker was included in the mailing (see Appendix E).

The response was overwhelmingly positive. MDPH received requests for over 3,000 stickers. MDPH and the U.S. Department of Labor have also worked together to create a bilingual sticker, which is disseminated nationally. It is available on the U.S. Department of Labor Youth Rules Web site at www.youthrules.dol.gov/posters.htm.



Getting the Word Out

Getting the word out about work-related injuries to youth is an important step on the pathway to prevention. Too often, teens and adults don’t think about the potential risks to teens until after a teen is injured. OHSP has used TAW data to create fact sheets with industry-specific findings and sentinel case examples, newsletters, and presentations (see Data Dissemination, pages 29-30).

Using Data to Educate Policymakers and Promote Collaboration to Protect Youth at Work

Data on the scope and nature of the young worker injury problem in Massachusetts has resulted in action by state agencies and other organizations to become more involved in prevention efforts. Over the years, OHSP has shared its data on young worker injuries with other state agencies. These data helped raise awareness of the scope of the problem and provided the motivation for these agencies to integrate young worker safety training and education into their work. Some examples of how sharing data with other agencies has promoted action include the following:

- The Department of Education distributed *Are You a Working Teen?* brochures to all schools, with a recommendation that they be distributed with work permits. The School-to-Career Office added a module on health and safety to the training program provided for school personnel who place youth in workplaces.
- The Attorney General's Office printed and disseminated young worker safety posters to schools, employers, and community groups.
- The Division of Industrial Accidents (Massachusetts's workers' compensation agency) helped create and disseminate *Under 18 and Hurt on the Job*, a brochure explaining workers' compensation to teens.
- The Regional OSHA Office encouraged its compliance assistance specialists to get involved in educational efforts targeting young workers. The Regional Office has included data on teen workers in their standard presentation for employers and their compliance assistance specialists have participated in train-the-trainer sessions using the *Safe Work/Safe Workers* curriculum. The Regional Office is also providing the OSHA 40-hour training to vocational education teachers in the construction trades in Massachusetts, who will, in turn, be able to provide their students with the OSHA 10-hour training.
- The Boston District Office of the U.S. Department of Labor, Wage, and Hour Division has called upon TAW to participate in their efforts to educate employers about federal child labor laws. The U.S. Department of Labor sponsored several educational sessions for small business employers in the retail bakery industry that included information on state and federal child labor laws, federal wage laws, and what to expect from an OSHA inspection. OHSP has used industry-specific data from TAW on occupational injuries to teens at these sessions to create a compelling argument for improving efforts to protect youth at work. These sessions have also provided an opportunity for TAW to obtain input from employers about their perceptions and needs regarding teens workers.

At the last session, TAW distributed a one-page survey to participants to obtain information about the types of education materials employers would like to have for teens and supervisors.

In 2000, it became apparent that the protection of young workers required a more broad-based, comprehensive effort. OHSP worked with nonprofit, academic, governmental, and community-based groups to convene the Massachusetts Young Worker Initiative (MYWI), a statewide coalition representing employers, government agencies, schools, parents, youth, and other interested parties. MYWI met for a year and a half and developed a set of recommendations for strategies designed to improve young worker safety. Government agency representatives provided background information for this effort, including data from the TAW project. At their initial meeting, OHSP provided MYWI with data to help the group focus its efforts. TAW data was eventually used in the introduction to the MYWI Task Force report *Protecting Young Workers in Massachusetts: Recommendations of the Massachusetts Young Worker Initiative Task Force* (see Appendix H). This data helped attract the attention of the media and legislators to the report's recommendations. The report was released in January 2003. Since that time, MYWI has continued to meet, and an Interagency Working Group on Youth Employment has been established to coordinate government agency efforts to address health and safety of young workers. (See Box below for a list of participating agencies.) MDPH facilitates the meetings, which are held every other month. At these meetings, agencies provide updates on their activities relevant to youth employment and identify opportunities for working together. A listserve has been created to facilitate communication between members outside of meetings. Working group members have collaborated on a number of

projects including, for example, joint presentations on federal, and state child labor laws; inclusion of workshops on health and safety in statewide School to Career meetings; and development of downloadable work permit application forms that include the state and federal child labor laws. The Interagency Working Group on Youth Employment is a valuable mechanism for pooling limited and fragmented government resources to improve young worker health and safety.

Interagency Working Group on Youth Employment Agency List

Massachusetts Department of Public Health
Massachusetts Office of Attorney General
Massachusetts Department of Education
Massachusetts Division of Occupational Safety
Massachusetts Department of Industrial Accidents
US Department of Labor - Wage and Hour Division
US Department of Labor - OSHA

Conclusion

TAW has been successful in raising the issue of young worker health and safety in Massachusetts as well as other states. Both NIOSH and OSHA now recognize teen workers as a public health priority. We hope that our experience in Massachusetts—and this guide—will further efforts to protect young people in workplaces.

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